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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,658	07/31/2003	Thomas A. Taylor	21320	9490

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EXAMINER	
BAREFORD, KATHERINE A	

ART UNIT	PAPER NUMBER
1792	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/630,658	TAYLOR, THOMAS A.	
	Examiner	Art Unit	
	Katherine A. Bareford	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 21 May 2008.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1,3-10 and 12-27 is/are pending in the application.

4a) Of the above claim(s) 14-20 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,3-10,12,13 and 21-27 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 5/21/08.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. The amendment of May 21, 2008 has been received and entered. With the entry of the amendment, claims 2 and 11 are canceled, claims 14-20 remain withdrawn from consideration, and claims 1, 3-10, 12, 13 and 21-27 (including new claims 25-27) are pending for examination.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1, 3-10, 12, 13 and 21-27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Independent claim 1 has been amended to provide producing a desired "uniform" microstructure coating (see lines 5 and 10). The other independent claims 23-27 have similar requirements. However these amendments are new matter, because while the disclosure as filed provides that the applied coating of the present process, is "more uniform" (see page 9 and Example 2, page 14 of the specification), it does not provide that the coating is actually uniform in its produced structure.

In new claims 25, 26 and 27, in the description of section (iv) it is provided that the "deposition efficiency and deposition rate of said coating would be greater than the deposition efficiency and deposition rate of a coating that would be produced using the smaller standoff of the non-shielded thermal spraying device" (emphasis added). However, the disclosure as filed provides that the rate would be "greater" than for a non-shielded thermal spraying device at the "same" standoff (see Example 2, page 14 in the specification). It is not indicated that the deposition efficiency and rate would be greater when the "smaller" standoff is used.

The other dependent claims do not cure the defects of the claims from which they depend.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 3-10, 12, 13 and 21-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zurecki et al (US 5738281) in view of Nowotarski et al (US 5486383) and the admitted state of the prior art.

Claims 1, 23, 24: Zurecki teaches a method of placing a gas shroud around a turbulent gas jet. *Column 1, lines 5-15.* This method can be used in spraying applications, such as thermal spray coating. *Column 4, lines 15-25.* An effluent jet exits from an orifice of the thermal spray device and is surrounded with a coaxial gas shield having a shield gas flow substantially surrounding the effluent of the thermal spray device. *Column 3, lines 1-25.* By using an inert surrounding gas, when thermal spraying, the amount of oxygen aspirated into the jet is reduced, thus minimizing the oxidation of the sprayed coating material and providing a desired microstructure of a coating with minimized oxidation of the coating material as supplied. *Column 4, lines 15-25.* As shown by Example 3, oxygen concentration in the spray jets of shrouded spray devices of Zurecki can be well over 50% less that for unshrouded jets at the same standoff distance (3 inches). *Column 9, lines 45-55 and column 11, lines 10-60, note, for example, in run no. 2, for example, with no shroud gas flow, the first or "0" flow rate, oxygen conc. is 14.0, going down to 2.1 as the flow rate of the shroud gas is increased (Table 2).*

Claims 3, 24, 27: As shown by Example 3, oxygen concentration in the spray jets of shrouded spray devices of Zurecki can be well over 50% less that for unshrouded jets at the same standoff distance (3 inches). *Column 9, lines 45-55 and column 11, lines 10-60, note, for example, in run no. 2, for example, with no shroud gas flow, the first or "0" flow rate, oxygen conc. is 14.0, going down to 2.1 as the flow rate of the shroud gas is increased (Table 2).*

Claim 4, 5: the gas flow can be essentially turbulent. *Column 3, lines 5-30 (the spray effluent from the spray device is turbulent, and the shroud gas is entrained in that flow).*

Claim 9: the shield (shroud) gas can be nitrogen. *See column 11, lines 10-60.*

Zurecki teaches all the features of these claims except (1) the resulting effect of the shield gas with (i) a uniform microstructure will allow an extended standoff distance for the same microstructure, as compared to without using a shield gas, and the other effects on (ii) density, (iii) segmentation crack density, (iv) deposition efficiency and deposition rate, (v) allowing coating on a complex shape, as claimed, (2) that the material to be sprayed is a ceramic oxide (claim 1, 6, 21, 23-27), which would be not sensitive to oxidation or nitridation, (3) that the shield gas is argon (claim 10), (4) that the ceramic oxide is zirconia (claims 7, 12), (5) that the multiple layers of coating material are provided (claims 8, 13), (6) that the substrate has a complex shape such as turbine blades or vanes (claims 1, 22) and (7) the specific gas temperature effects of using the shield gas (claim 1, 23-27).

However, Nowotarski teaches that when thermal spraying, a turbulent fluid stream is ejected from a spray nozzle. *Column 3, lines 20-60.* The stream can carry coating material which can be metals, alloys, oxides, ceramics, and other materials. *Column 3, lines 20-65.* Nowotarski teaches the desire to surround the stream with a shielding gas flow of an inert gas such as nitrogen, argon, etc. *See column 3, line 60 through column 4, line 40.* The use of this shielding gas prevents oxygen from entering the spray stream so that oxidation or contamination or degradation of materials is minimized. *Column 4, lines 20-35 (this provides for a uniform microstructure to the extent claim, because contamination or degradation of the material will not occur).* The amount of

shielding fluid used is such that the oxygen level at the point of impact can be less than 1%. *Column 4, lines 25-35.* Nowotarski teaches that by reducing the oxygen level, the standoff distance can be increased. *Column 7, lines 35-55.* Nowotarski provides that the standoff distance can be increased by the use of a shielding gas whether the gas is heated or unheated, as in example 1, column 6, lines 40-60, which indicates that a six inch standoff can be used compared to 4 inches in the prior art with an oxygen level of 0.01%, and note example 2, at column 7, lines 20-35, indicates that the example 1 conditions did not have a heated gas (since it requires a change in conditions to provide heated gas), and note example 2, at column 7, lines 40-55, which indicates that still further increases in standoff can be provided with heated gas.

The admitted state of the prior art, *at pages 4-5 of the specification*, teaches that it is well known to apply ceramic coatings by thermal spraying. These ceramic coatings can include thermal barrier coatings. The thermal barrier coatings are often multilayer coatings with a metallic bond coat followed by a ceramic top coat. The ceramic top coat is usually based on zirconium oxide (zirconia -- zirconia would be non-sensitive material as claimed—see claim 12 of the present application). The metallic bond coat can also be applied by thermal spraying. The admitted state of the art further teaches that it is well known to apply these thermal spray coatings to complex shapes such as turbine vanes.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to (1) modify Zurecki to use the shield gas system to increase the

standoff distance but still achieve the same uniform microstructure resulting from spraying without the shield gas at a shorter standoff distance as suggested by Nowotarski in order to provide a desirable coating, because Zurecki teaches that the use of the coaxial shielding gas provides a decreased oxygen level in the spray stream for a given distance, thus reducing oxidation of the applied coating (that is, providing a desired microstructure of limited further oxidation effects) and Nowotarski teaches that the use of shielding gas that provides a decreased oxygen level in the spray stream for a given distance can allow an increased standoff distance, and that the shielding gas can be used to reduce oxidation, contamination or degradation of the material (again providing a desired uniform microstructure). This provides a longer standoff distance to get the same microstructure as without shielding, because the resulting microstructure provided by the presence of a first amount of oxygen will not occur until a longer standoff distance when shielding is used since that first amount of oxygen will be present in the stream a much greater distance (more than 50 % as shown by Zurecki) from the nozzle. The standoff distance would be increased more than 50% since the contents of the stream that produces the effective microstructure occurs at a more than 50% greater distance. As to the further features of the other effects on (ii) density, (iii) segmentation crack density, (iv) deposition efficiency and deposition rate, (v) allowing coating on a complex shape, as claimed, it is the Examiner's position that these features will flow naturally from providing the shield gas system of Zurecki in view of Nowotarski that allows increase in the standoff distance but still achieves the same

uniform microstructure, because it is the presence of the same shield gas system that provides these features. The fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). (2) It would further have been obvious to modify Zurecki to perform the spraying with ceramic oxides, which would be materials not sensitive to oxidation or nitridation (as they have already been oxidized), as taught by Nowotarski with an expectation of desirable coating results, because Zurecki teaches a desirable shield gas spraying system and Nowotarski teaches the desire to shield coatings of ceramics and oxides as well as metals, as the shield also prevents contamination as well as oxidation. (3) It would further have been obvious to modify Zurecki to perform the shielding with argon as taught by Nowotarski with an expectation of desirable coating results, because Zurecki teaches the desire to shield with an inert gas, such as nitrogen, and Nowotarski also teaches the desire to shield coating sprays with inert gases, and that inert gas for shielding can beneficially include argon as well as nitrogen. (4), (5), (6) It would further have been obvious to modify Zurecki in view of Nowotarski to apply a zirconia coating (zirconia would be non-sensitive material as claimed—see claim 12 of the present application), to apply a multilayer coating such as a thermal barrier coating of metallic bond coat followed by ceramic top coat, and to apply the coating to a complex shape such as a turbine vane/blade using the shielded gas system as suggested by the admitted state of the

prior art with an expectation of providing a desirable coating, because Zurecki in view of Nowotarski teaches a gas shielding system for thermal spraying that can be beneficially used with metals or ceramic oxides and the admitted state of the prior art teaches that when thermal spraying a desirable coating system to apply is metal bond coats followed by zirconia (zirconium oxide) top coats to a complex shaped substrate such as a turbine vane/blade. (7) As to the specific gas temperature effects of using the shield gas (as claimed in the last six lines of claim 1), it is the Examiner's position that such temperature effects would naturally occur with the use of the process of Zurecki in view of Nowotarski and the admitted state of the prior art as described above, because it is the suggested use of the shield gas that provides these gas temperature effects, and the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). For example, the Examiner notes that Zurecki provides increasing flow rates of shield gas in its own tests (see Table 2, column 11, line 35).

6. Claims 1, 3-10, 12, 13 and 21-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zurecki et al (US 5738281) in view of Nowotarski et al (US 5486383) and Taylor, et al "Experience with M Cr Al and thermal barrier coatings produced via inert gas shrouded plasma deposition" (hereinafter Taylor article).

Claims 1, 23, 24: Zurecki teaches a method of placing a gas shroud around a turbulent gas jet. *Column 1, lines 5-15.* This method can be used in spraying applications, such as thermal spray coating. *Column 4, lines 15-25.* An effluent jet exits from an orifice of the thermal spray device and is surrounded with a coaxial gas shield having a shield gas flow substantially surrounding the effluent of the thermal spray device. *Column 3, lines 1-25.* By using an inert surrounding gas, when thermal spraying, the amount of oxygen aspirated into the jet is reduced, thus minimizing the oxidation of the sprayed coating material and providing a desired microstructure of a coating with minimized oxidation of the coating material as supplied. *Column 4, lines 15-25.* As shown by Example 3, oxygen concentration in the spray jets of shrouded spray devices of Zurecki can be well over 50% less that for unshrouded jets at the same standoff distance (3 inches). *Column 9, lines 45-55 and column 11, lines 10-60, note, for example, in run no. 2, for example, with no shroud gas flow, the first or "0" flow rate, oxygen conc. is 14.0, going down to 2.1 as the flow rate of the shroud gas is increased (Table 2).*

Claim 3, 24, 27: As shown by Example 3, oxygen concentration in the spray jets of shrouded spray devices of Zurecki can be well over 50% less that for unshrouded jets at the same standoff distance (3 inches). *Column 9, lines 45-55 and column 11, lines 10-60, note, for example, in run no. 2, for example, with no shroud gas flow, the first or "0" flow rate, oxygen conc. is 14.0, going down to 2.1 as the flow rate of the shroud gas is increased (Table 2).*

Claim 4, 5: the gas flow can be essentially turbulent. *Column 3, lines 5-30 (the spray effluent from the spray device is turbulent, and the shroud gas is entrained in that flow).*

Claim 9: the shield (shroud) gas can be nitrogen. *See column 11, lines 10-60.*

Zurecki teaches all the features of these claims except (1) the resulting effect of the shield gas with (i) a uniform microstructure will allow an extended standoff distance for the same microstructure, as compared to without using a shield gas, and the other effects on (ii) density, (iii) segmentation crack density, (iv) deposition efficiency and deposition rate, (v) allowing coating on a complex shape, as claimed, (2) that the material to be sprayed is a ceramic oxide (claim 1, 6, 21, 23-27), which would be not sensitive to oxidation or nitridation, (3) that the shield gas is argon (claim 10), (4) that the ceramic oxide is zirconia (claims 7, 12), (5) that the multiple layers of coating material are provided (claims 8, 13), (6) that the substrate has a complex shape such as turbine blades or vanes (claims 1, 22) and (7) the specific gas temperature effects of using the shield gas (claim 1, 23-27).

However, Nowotarski teaches that when thermal spraying, a turbulent fluid stream is ejected from a spray nozzle. *Column 3, lines 20-60.* The stream can carry coating material which can be metals, alloys, oxides, ceramics, and other materials. *Column 3, lines 20-65.* Nowotarski teaches the desire to surround the stream with a shielding gas flow of an inert gas such as nitrogen, argon, etc. *See column 3, line 60 through column 4, line 40.* The use of this shielding gas prevents oxygen from entering the spray stream so that oxidation or contamination or degradation of materials is minimized. *Column 4, lines 20-35 (this provides for a uniform microstructure to the extent claim, because contamination or degradation of the material will not occur).* The amount of

shielding fluid used is such that the oxygen level at the point of impact can be less than 1%. *Column 4, lines 25-35.* Nowotarski teaches that by reducing the oxygen level, the standoff distance can be increased. *Column 7, lines 35-55.* Nowotarski provides that the standoff distance can be increased by the use of a shielding gas whether the gas is heated or unheated, as in example 1, column 6, lines 40-60, which indicates that a six inch standoff can be used compared to 4 inches in the prior art with an oxygen level of 0.01%, and note example 2, at column 7, lines 20-35, indicates that the example 1 conditions did not have a heated gas (since it requires a change in conditions to provide heated gas), and note example 2, at column 7, lines 40-55, which indicates that still further increases in standoff can be provided with heated gas.

Taylor article teaches that it is well known to apply ceramic coatings by plasma spraying, a form of thermal spraying. *Page 2526-2527.* These ceramic coatings can include thermal barrier coatings. *Page 2526-2527.* The thermal barrier coatings can be multilayer coatings with a metallic bond coat followed by a ceramic top coat. *Page 2527.* The ceramic top coat is can be based on zirconium oxide (zirconia-- zirconia would be non-sensitive material as claimed—see claim 12 of the present application). *Page 2527.* The metallic bond coat can also be applied by plasma spraying. *Page 2527 (the M Cr Al coat).* Taylor article further teaches that it is well known to apply these thermal spray coatings to complex shapes such as turbine vanes. *See page 2530, first column.* Taylor article also teaches that it is beneficial to apply the M Cr Al coat by shrouded (shielded gas) plasma spraying. *Pages 2526-2527.* Furthermore, Taylor article teaches that the

oxide ceramic thermal barrier overcoat can also desirably be applied by the same shrouded plasma spray (SPS) system, allowing the two layer system to be applied in the same setup using the same torch by simply switching from one powder dispenser to another. *Page 2527, first column.* The shrouding (shielding) gas can be argon. *Page 2526.* Taylor article teaches the desirable uniform microstructure from shielded spray. *Page 2526 (the equiaxed fine grains free of oxide).*

It would have been obvious to one of ordinary skill in the art at the time the invention was made to (1) modify Zurecki to use the shield gas system to increase the standoff distance but still achieve the same uniform microstructure resulting from spraying without the shield gas at a shorter standoff distance as suggested by Nowotarski and Taylor article in order to provide a desirable coating, because Zurecki teaches that the use of the coaxial shielding gas provides a decreased oxygen level in the spray stream for a given distance, thus reducing oxidation of the applied coating (that is, providing a desired microstructure of limited further oxidation effects) and Nowotarski teaches that the use of shielding gas that provides a decreased oxygen level in the spray stream for a given distance can allow an increased standoff distance, and that the shielding gas can be used to reduce oxidation, contamination or degradation of the material (again providing a desired uniform microstructure) and Taylor article further teaches that it is desirable to use a shrouding (shielding) gas when thermal spraying materials such as oxide thermal barrier coatings to provide more efficient spraying and the desirable uniform microstructure with shielded spraying. This

provides a longer standoff distance to get the same microstructure as without shielding, because the resulting microstructure provided by the presence of a first amount of oxygen will not occur until a longer standoff distance when shielding is used since that first amount of oxygen will be present in the stream a much greater distance (more than 50 % as shown by Zurecki) from the nozzle. The standoff distance would be increased more than 50% since the contents of the stream that produces the effective microstructure occurs at a more than 50% greater distance. As to the further features of the other effects on (ii) density, (iii) segmentation crack density, (iv) deposition efficiency and deposition rate, (v) allowing coating on a complex shape, as claimed, it is the Examiner's position that these features will flow naturally from providing the shield gas system of Zurecki in view of Nowotarski and Taylor article that allows increase in the standoff distance but still achieves the same uniform microstructure, because it is the presence of the same shield gas system that provides these features. The fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). (2), (4), (5), (6) It would further have been obvious to modify Zurecki to perform the spraying with ceramic oxides, such as zirconia (zirconia would be non-sensitive material as claimed—see claim 12 of the present application), which would be materials not sensitive to oxidation or nitridation (as they have already been oxidized), and to apply a multilayer coating such as a thermal barrier coating of metallic

bond coat followed by ceramic top coat, and to apply the coating to a complex shape such as a turbine vane/blade using the shielded gas system as suggested by Nowotarski and Taylor article with an expectation of desirable coating results, because Zurecki teaches a desirable shielded gas spraying system, and Nowotarski teaches the desire to shield coatings of ceramics and oxides as well as metals, as the shield also prevents contamination as well as oxidation, and Taylor article further teaches that when thermal spraying a desirable coating system to apply is metal bond coats followed by zirconia top coats to a complex shaped substrate such as a turbine vane/blade using a shrouded (shield gas) plasma spraying system. (3) It would further have been obvious to modify Zurecki to perform the shielding with argon as taught by Nowotarski and Taylor article with an expectation of desirable coating results, because Zurecki teaches the desire to shield with an inert gas, such as nitrogen, and Nowotarski also teaches the desire to shield coating sprays with inert gases, and that inert gas for shielding can beneficially include argon as well as nitrogen and Taylor article further teaches the use of argon as a shielding gas when plasma spraying oxides. (7) As to the specific gas temperature effects of using the shield gas (as claimed in the last six lines of claim 1), it is the Examiner's position that such temperature effects would naturally occur with the use of the process of Zurecki in view of Nowotarski and Taylor article as described above, because it is the suggested use of the shield gas that provides these gas temperature effects, and the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis

for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). For example, the Examiner notes that Zurecki provides increasing flow rates of shield gas in its own tests (see Table 2, column 11, line 35).

Response to Arguments

7. Applicant's arguments filed May 21, 2008 have been fully considered but they are not persuasive.

Applicant argues, as to both 35 USC 103 rejections, that the unexpected discoveries by applicant as to the extended standoff without degradation of microstructure or other properties, the higher density, higher deposition efficiency, higher deposition rate, higher segmentation crack density, and more uniform microstructure have now been claimed, and that the cited references, alone or in combination, do not provide the claimed features, including using the coaxial gas shield in thermal spraying a ceramic material, lengthening the standoff distance between the surface of the substrate having a complex shape and the exit end of a shielded thermal spray device, with the above features as to the extended standoff without degradation of microstructure or other properties, the higher density, higher deposition efficiency, higher deposition rate, higher segmentation crack density, and more uniform microstructure.

The Examiner has reviewed these arguments, however, the rejection above has been maintained. As discussed in the rejection above, and as affirmed by the Board of Appeals previously, the combination of cited references has provided the shielded thermal spraying of ceramics, including using the coaxial gas shield in thermal spraying a ceramic material, lengthening the standoff distance between the surface of the substrate having a complex shape and the exit end of a shielded thermal spray device, with the above features as to the extended standoff without degradation of microstructure or other properties. As to the further, newly claimed features, of the higher density, higher deposition efficiency, higher deposition rate, higher segmentation crack density, and more uniform microstructure, at the least, it is the Examiner's position that these features will flow naturally from providing the shield gas system of the cited references that allows increase in the standoff distance but still achieves the same uniform microstructure, because it is the presence of the same shield gas system that provides these features. The fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Katherine A. Bareford/
Primary Examiner, Art Unit 1792